

ture is firm and slightly rubbery; it is imperative to keep rubberiness to a minimum. On biting and chewing, the body yields easily, forming fine curd particles. Also, the curd particles should be kept as small as possible. Large curd particles and a rubbery texture detract most from its acceptability. Rather than define exactly the method of precipitation, we have described the desirable end product. Precipitation can be varied slightly while still achieving a satisfactory curd. However, our method is adequate for demonstration.

Milk curd fried and soaked in water has remained wholesome and attractive for 2 weeks in a covered container at 4 C. Fried curd sterilized at 120 C for 20 minutes was similarly wholesome and palatable for 90 days at 25 C. The approximate composition of milk curd before and after drying is in Table 1. The curd before frying had 80% moisture and after frying 64.3%.

TABLE 1. Composition of milk curd before and after frying.

	Curd before frying	Curd after frying ^a
	—(% of dry weight)—	
Fat	3.05	12.60
Protein	78.60	76.59
Lactose	6.30	0.14
Ash	9.00	7.84
Calcium	2.93	2.53
Phosphorus as PO ₄	5.20	4.33

^a After soaking 12 hours in water and draining.

Deep-fried milk curd is different from other dairy foods commercially available and it can

be used to develop new products. Its advantages are nutritive value from milk protein; good texture, resembling meat; bland and easily flavored; does not deteriorate on heating and can be canned; and has good storage qualities with refrigeration.

The most coveted quality of deep-fried curd is its desirable body and texture which will not deteriorate on extensive heating. It was demonstrated that fried milk curd mixed with a meat-flavored gravy, canned and sterilized was similar in many respects to meat in a meat gravy. Although unlikely to replace canned meat on the grocer's shelf, it does demonstrate the possibility of making an attractive meat-like food.

There may be other uses for fried milk curd such as snacks, hors d'oeuvres, or confections. The texture and flavor may be made to suit individual tastes. A firm, dense texture is easily obtainable and it may be possible to obtain a softer or lighter product with cereals or other fillers. The availability of a variety of natural and synthetic food flavors provides the possibility for many new products.

Our intent is to show the need for fresh ideas in development of new and different dairy products and to describe a food that has potential. Fried milk curd is not a finished product, but an idea for further development.

References

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- (2) Development of High Protein Foods to Meet the Needs of the World. International Symposium, 63rd Annual Meeting, American Dairy Science Association. 1969. *J. Dairy Sci.*, 52: 409.

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New High-Protein Food from Milk

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Abstract

Milk curd precipitated with calcium chloride and fried in deep fat is a new high-protein food. The fried curd is nutritious, has desirable texture and storage stability, and can be flavored for a variety of tastes.

Introduction

The International Symposium at the 63rd Annual Meeting of the American Dairy Science Association, June 17, 1968, selected as its theme, Development of High-Protein Foods to Meet the Needs of the World (2). The speakers emphasized the development of newer protein sources and products needed to satisfy the world's burgeoning population.

Milk and dairy products are important supplements to the diets of people living in underdeveloped countries and in underprivileged areas in the United States. Certainly, milk is a nutritious food and large surpluses of certain milk products are available for overseas shipment from the United States. However, milk products, particularly forms of fluid milk (or milk powder to be reconstituted) have not been accepted readily by all peoples. This reluctance is often because milk is foreign to the diets of some people. Unwillingness to accept milk is founded on a universal attitude that people prefer foods with which they are acquainted. In countries where milk is not popular, it is not only unacceptable but is discriminated against. An alternative would be to formulate new foods from milk to suit the tastes of such people.

It is our opinion that starting with milk, a variety of new products can be made that will satisfy the tastes of internationals in many

countries. Attributes needed are good texture, nutritive value, convenience, and storage stability.

A concept for a new food made from milk protein which meets these requirements has been developed in our laboratory. The product is milk curd fried in deep fat. Being very bland, it can be flavored for any taste. It has a texture similar to meat but does not fall apart on prolonged heating. The product is nutritious, being high in protein. It can be canned and sterilized, and preliminary experiments have shown good storage qualities.

General Procedure

Milk curd is precipitated from skimmilk with 0.10% CaCl_2 and heating to 85-88 C. Milk proteins have been precipitated with CaCl_2 (1); however, for fried curd special precautions must be taken. It has the most desirable texture when it is precipitated as a fine flocculated curd because large particles become tough. It is gathered by filtering through 2 layers of cheese cloth and rinsing with a volume of cold water equal to one-fourth the total volume of milk. The cheese cloth is then closed and the curd is drained overnight at 4 C. At this stage moisture of the curd should be about 80%. Appearance of the curd should be soft and springy but firm enough to retain its shape. The interior should be closely knit and show no discrete particles or crumble when cut or broken.

The curd is cut into bite-size pieces and deep fried in hot oil at 180-185 C until slightly brown. (Curd fried too long or too brown becomes tough.) It is then soaked in cold water until used. (Curd allowed to dry also tends to be tough.) At this stage the fried curd has a bland, slightly sweet, milky taste. The fried character or oily taste is also evident. The tex-